Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
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Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion;	)	GN Docket No. 18-238
	)	
Communications Marketplace Report;	)	GN Docket No. 18-231
	)	
Modernizing the FCC Form 477 Data Program	)	WC Docket No. 11-10

COMMENTS OF NEW AMERICA'S OPEN TECHNOLOGY INSTITUTE

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Contents

I. Introduction

In its 2018 *Broadband Deployment Report,* the Commission concluded that high-speed broadband internet access service ("broadband" or "BIAS") was being deployed in a "reasonable and timely fashion."[1] The Commission justified its conclusion because it measured year-over-year deployment figures and determined that they met some unknown standard. In reaching that conclusion. Unfortunately, the Commission glossed over the 24 million Americans who still lack any option for high-speed broadband.[2] Further, the Commission's report found that only 69.3% of Americans living in rural areas lived in a census block where at least one fixed internet service provider (ISP) had deployed high-speed fixed broadband.[3] This suggests that the Commission still has a lot of work to do to bridge the digital divide, and that advanced telecommunications capability is *not* being deployed to all Americans in a reasonable and timely fashion.

In these comments, OTI argues the following: (1) the Commission needs to improve its current data collection practices to get a better understanding of broadband deployment and access; (2) the current interpretation of what defines advanced telecommunications capability deployment to all Americans in a reasonable and timely fashion is flawed; (3) the Commission should not consider one provider adequate competition in its Section 706 review; (4) mobile BIAS continues to be a complement, and

[1] 2018 Broadband Deployment Report ("2018 Broadband Deployment Report"), GN Docket No. 17-199, (Feb. 2, 2018), ¶ 94, https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2018-broadband-deployment-report.
[2] *Id.* at ¶ 50.
[3] *Id.* at Table 1.

not a substitute, to fixed BIAS; (5) the Commission should increase its throughput benchmarks; (6) the Commission should address natural disasters in assessing broadband deployment; (7) the Commission should work with state and local government to remove barriers to municipal broadband; and (8) the Commission should continue to support spectrum-sharing frameworks and unlicensed spectrum to improve broadband connectivity.

First, the very data the Commission uses as a basis to analyze the state of broadband deployment, and whether it is being deployed to all Americans in a reasonable and timely fashion, is flawed. The Commission relies primarily on Form 477 data, which is known to over count broadband deployment and has known inaccuracies. Internet service providers ("ISPs") "serve" an entire census block if they provide service to one address in that block, even if a large majority of households in that census block do not have access to broadband at those throughput speeds. Further, ISPs need only disclose possible, not actual, speeds. The Commission should collect data from a diverse set of sources and should collect broadband pricing and performance data.

Second, the Commission should reconsider its year-over-year approach to measuring broadband deployment. A year-over-year comparison will become a self-fulfilling prophecy as broadband providers are always investing in their networks. However, if the Commission does choose to continue its year-by-year review of progress, OTI urges the Commission to adopt clear parameters for how it is defining progress under Section 706.

Third, ensuring competition is an important part of ensuring deployment of broadband. The Commission should not deem one provider as sufficient competition for "reasonable and timely" deployment. In its 2018 *Broadband Deployment Report,* the Commission measured broadband deployment by taking the summation of populations across all census blocks with at least one BIAS provider. This method is flawed, and provides a distorted picture of broadband availability considering the importance of competition in promoting broadband deployment. The Commission should determine the number of Americans with BIAS access by implementing a tiered approach that reports the population of Americans with one, two, and three or more high-speed broadband providers (at tiers 25/3 and above), similar to what it did in the 2017 Restoring Internet Freedom Order and in its Internet Access Services Reports.

Fourth, the Commission should determine, as it did in its 2018 *Broadband Deployment Report,* that mobile BIAS is not a substitute for fixed BIAS. There have been no significant changes to the differences between mobile and fixed BIAS that make the two services strong complements, but that also limit mobile from serving as a replacement for fixed. Consumers still see the services as distinct. And despite the predictions of mobile 5G networks, the Commission should not take these future and currently nonexistent networks into account when determining whether mobile BIAS is or will ever be a substitute for fixed BIAS. Mobile 5G networks, while carrying a lot of promise, are years away from deployment at a scale where the Commission can adequately assess their utility compared to fixed BIAS.

Fifth, the Commission should increase its throughput benchmarks. The Commission should look ahead to future consumer needs in setting throughput benchmarks, and adopt a symmetrical throughput benchmark for download and upload. In conducting its Section 706 review of advanced telecommunications capability, the Commission should be setting its goals to ensure that the country is challenging other countries to have the fastest, most reliable, and most ubiquitous BIAS access. As demand for faster BIAS access with more capacity increases, the Commission needs to adopt higher throughput benchmarks to accommodate burgeoning industries and a higher consumption of data for education, work, and entertainment.

Sixth, the Commission should review the effects of natural disasters as a part of its Section 706 review. The level of destruction in the aftermath of natural disasters does incredible damage to communications networks. Recent devastation in places such as Puerto Rico following hurricanes last year show just how destructive these storms can be. The Commission should study the effects of natural disasters in areas hit by them and include it as part of its Section 706 report. The Commission should also prioritize Universal Service Fund subsidies toward rebuilding destroyed communications network infrastructure.

Seventh, the Commission should work with state and local government counterparts to remove barriers to municipal broadband, and help close the digital divide. Several states have laws that prohibit or restrict the creation of community broadband networks, and those laws present significant regulatory barriers to investment by

competitive networks. Municipal networks can provide broadband where there was none, or provide higher quality broadband where a private provider is unwilling to serve the community's needs—particularly in rural areas. The Commission should work to reduce the barriers for communities to provide themselves a viable option for high-speed broadband.

Finally, the Commission should promote spectrum-sharing frameworks in mid-band spectrum and free up more spectrum in the 6 GHz band to improve connectivity and bring high-speed broadband to unserved and underserved areas. In particular, the Commission should retain the rules for Priority Access Licenses (PALs) in the 2015 Citizens Broadband Radio Service rules governing shared use of the 3.5 GHz band. The Commission should also move to authorize licensed, point-to-multipoint use of the 3.7-4.2 GHz band so that fixed wireless providers can bring high-speed broadband to rural and other areas in the country currently lacking access. The proposal would protect Fixed Satellite Service incumbents, and allow mobile carriers to buy licenses in a portion of the band, particularly in urban areas with high population densities to help build out their mobile 5G networks. Additionally, the Commission should free up spectrum in the 6 GHz band for unlicensed use, and to add capacity to Wi-Fi and other unlicensed technologies as demand for both grow.

II. The Commission's inquiry should not rely solely on flawed Form 477 data

The Commission requests comment on what datasets it should use to assess the availability of fixed broadband services to Americans and the extent to which ISPs have

deployed high-speed broadband.[4] The Commission suggests relying on Form 477 data after 2014, and using the State Broadband Initiative data for 2012-2014.[5] However, as the Commission has previously acknowledged, relying solely on Form 477 data is likely to overstate the extent to which ISPs have deployed high-speed broadband.[6] The Commission cannot continue to rely on industry-reported data to conduct a thorough review of broadband deployment, availability, and competition. Further, the Commission should collect more and more accurate broadband deployment data through trusted third parties.

A. The Commission needs more and better data to fully comply with Section 706, and relying on Form 477 is insufficient

The Commission currently depends on Form 477 data to determine the availability of high-speed broadband across the country.[7] As the Commission knows, however, Form 477 data is flawed in key ways.

Form 477 needs to collect more refined data to make an accurate Section 706 finding. The Commission recognized Form 477's flaws nearly 10 years ago in the National Broadband Plan.[8] The data generated by Form 477 often does not accurately reflect the on-

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[4] Fourteenth Broadband Deployment Report Notice Of Inquiry, GN Docket No. 18-238 (Aug. 9, 2018), ¶ 16.
[5] *Id.*
[6] 2018 Broadband Deployment Report, ¶ 43 & n.128.
[7] 2018 Broadband Deployment Report, ¶ 43 ("We rely primarily upon our FCC Form 477 deployment data to evaluate deployment for fixed and mobile services.").
[8] Federal Communications Commission, *Connecting America: The National Broadband Plan*, Dkt. No. 09-51 (2010), at 41 (National Broadband Plan). See also Federal Communications Commission, *Fixed Broadband Deployment Data from Form 477*, https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477 ("A provider reports deployment of a particular technology and bandwidth in a census block may not necessarily offer that service everywhere in the block. Accordingly, a list of providers deployed in a census block does not necessarily reflect the number of choices available to any particular

the-ground reality of broadband service in the United States, largely because the form does not collect sufficiently granular information. For example, the form currently collects subscription data by census tract (for fixed broadband service) and at the state level (for mobile broadband service), neither of which provide adequate insight into competition or service levels. Tract-level data does not reliably assess how many people or households subscribe to service in a specific neighborhood, nor does it sufficiently identify areas that lack access to services. In rural tracts, low population density can skew an analysis since a large tract will show up as "served" or with a large percentage of households subscribing even if only one person in that tract has service. Without more granular deployment data collected at the address level, the Commission's Section 706 determinations will continue to be inaccurate.

Further, ISPs are only required to report the speeds that they *could* provide in a given area. They are not obligated to report the actual broadband speeds experienced by consumers.[9] An ISP, therefore, is able to report that high-speed broadband (at 25 Mbps download/ 3 Mbps upload speeds, or "25/3") is being deployed to a specific census tract if it could feasibly do so, even if it does not offer that service to the people in that census block and therefore nobody actually has access to it. This massive caveat to the reporting

household or business location in that block, and the number of such providers in the census block does not purpose to measure competition").

[9] Comments of New America's Open Technology Institute, the Institute for Local Self-Reliance, National Association of Telecommunications Officers and Advisors, National League of Cities, and Next Century Cities, GN Docket No. 18-231, (Aug. 17, 2018), at 3-8 ("OTI et al. Fixed Competition Comments").

requirements allows ISPs to overstate their coverage and distorts the reality of broadband access and deployment, particularly in rural and hard-to-serve areas.

Form 477 data may even be wrong. The rural community of Laurel Ridge provides a good example. Laurel Ridge is a residential housing development that sits between two mountains close to Black Mountain, North Carolina. According to a recent filing, Form 477 data did not match the service they actually receive.[10] AT&T's Form 477 claims it provides 6 Mbps broadband service to the census blocks of Laurel Ridge, despite the fact that "almost no one receives this level of service from AT&T."[11] The lack of service posed issues for residents there who work from home and children who require broadband for educational purposes. The Commission even has proceedings open for Americans to challenge the accuracy of mobile service maps in connection with the Connect America Fund.[12]

West Virginia officials reported similar inaccuracies. The 2018 *Broadband Deployment Report* found that seven West Virginia counties had 100-percent access to a fixed broadband connection[13] Moreover, the 2018 *Broadband Deployment Report* claimed that 82.2% of West Virginians had access to high-speed (meaning 25 Mbps download

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[10] Letter to Chairman Pai from Jerry Morris, President of the Laurel Ridge Property Owner's Association, GN Docket No. 18-231, (Aug. 17, 2018), https://ecfsapi.fcc.gov/file/10822290622472/FCC%20letter%2018-231(final).pdf ("Laurel Ridge Letter").
[11] *Id.*
[12] Joan Engebretson, *Pai Wants to Extend Mobility Fund Challenge Process*, Telecompetitor (May 31, 2018), https://www.telecompetitor.com/pai-wants-to-extend-mobility-fund-challenge-process/.
[13] Max Garland, *WV broadband council chairman blasts FCC report, says data isn't correct,* Charleston GazetteMail (Feb. 8, 2018), www.wvgazettemail.com/business/wv-broadband-council-chairman-blasts-fcc-report-saysdata-isn/article_d98cf35b-e9ac-5f82-93a9-b214770656db.html.

speeds) broadband.[14] In fact, data from West Virginia's Internet Speed Test showed that about half of those tested had connection speeds of less than 10 Mbps download speeds, causing a West Virginia official to argue the Commission's data is "not even close to correct."[15]

The Commission's flawed broadband deployment and availability data has wide-ranging implications. For example, the Census Bureau plans to conduct its first-ever internet-based U.S. Census in 2020.[16] Households that lack internet access will be sent paper forms via the U.S. Postal Service; good federal data about the digital divide could help the Census Bureau identify and target such households to ensure that they are counted. However, if the Census Bureau were to rely on the government's current broadband maps, it would almost certainly fail to identify millions of Americans. This gap could severely undermine the accuracy of the 2020 Census and the wide range of activities that depend on Census data, including Congressional reapportionment, allocation of federal funding, and billions of dollars in business activity and research.

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[14] 2018 Broadband Deployment Report at Table D1, page 63.

[15] *Id.* One could argue that the discrepancy of the Commission's figure of about 20% of West Virginians lacking high-speed broadband to the West Virginia government's figure of about 50% arose because some West Virginians have the *choice* of 25 Mbps download speeds and opt not to get that tier of service. However, parsing through contradictory findings such as these in West Virginia is exactly the sort of analysis the Commission should be doing in its deployment reports under Section 706, instead of merely aggregating industry-reported data from one source.

[16] *See* James Barron, *Preparing for the 2020 Census, One Address at a Time*, N.Y. Times (Mar. 8, 2018), https://www.nytimes.com/2018/03/09/nyregion/census-2020-new-york.html.

B. The Commission should collect data from a variety of sources, including trusted third parties, to test broadband performance

Measuring deployment should not end with determining whether a census block is "served" or not. It should also take into account competition and affordability. The inclusion of diversified deployment data, as well as performance and pricing data, would fill the gaps left by reliance on Form 477 data.[17] As Ookla stated in the Commission's inquiry into the state of competition in the fixed broadband marketplace, "[t]raditional fixed network coverage and advertised speeds sourced through FCC Form 477 provide foundational layers of intelligence. However, to broadly assess the health of the marketplace, considerably deeper data sets and analyses are required."[18] The speed and the price of broadband internet service are the two biggest factors people consider when purchasing a plan, and the Commission should collect robust data on both performance and pricing if it seeks to gain a genuine understanding of broadband availability.[19]

1. The Commission should collect broadband performance data

As discussed above, ISPs are required to report through Form 477 the speeds at which they feasibly *could* deploy in a given area. However, there is currently no way to verify whether providers are actually providing those speeds to consumers in any census

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[17] *Id.*

[18] Comments of Ookla, GN Docket No. 18-231, (Aug. 17, 2018), https://ecfsapi.fcc.gov/file/1081737256710/Ookla_Wireline%20Competition%20Bureau%20Filing_18-231.pdf, at 2 ("Given the complexity of the U.S. telecommunications landscape, multi-layered, highquality data sets are required to properly analyze the broadband marketplace; no single source or type of information can capture the entire landscape.").

[19] Russo et al., *Cost of Connectivity 2014*, New America's Open Technology Institute (Oct. 2014), https://www.newamerica.org/oti/the-cost-ofconnectivity-2014/.

block, as the discrepancy in the West Virginia case detailed above reflected. It is crucial for the Commission, as part of its review of broadband deployment and availability, to assess the actual service consumers experience.

The Commission has already begun the practice of diversifying datasets. In the 2018 *Broadband Deployment Report,* the Commission used Ookla data to bolster its Form 477 data because "actual speeds tend to be much faster than the minimum advertised speed."[20] It used Ookla data only for mobile data, not fixed. But the logic is similar for both and both data sets should be supplemented by trusted third-party speed test data because it will help provide a more accurate picture of what consumers actually experience.

The Commission should also consider Measurement Lab (M-Lab) as a model for broadband measurement.[21] M-Lab is the largest open source internet measurement effort in the world, and it hosts hundreds of servers throughout the world that enable anyone to test their connection. This open source method offers a more realistic gauge of the consumer experience than ISP-hosted speed tests, because unlike ISP-hosted speed tests, M-Lab servers are located outside of any ISP's last-mile network. M-Lab collects approximately 2 million measurements per day, producing a large, global dataset that is growing every day. M-Lab has been used to measure broadband speeds throughout the country, in many cases for similar projects to the Commission's work under Section 706 to

[20] 2018 Broadband Deployment Report, ¶ 47.
[21] OTI is a partner of M-Lab.

assess the availability of high-speed broadband. In 2017, Seattle used M-Lab to create a citywide map of broadband speeds.[22] The map relies on user speed tests, along with user input that gives the name of their ISP, the speeds advertised in their service plan, and the cost of their service. All of that information is aggregated to produce a detailed map of broadband availability based on consumer-generated data instead of self-reported and unverified data of Form 477.[23] The city of Louisville similarly used M-Lab, in a partnership with a local civic technology company, to create a broadband mapping tool that enabled users to test their internet connection and had that data populate the map.[24] The use of M-Lab data in Seattle and Louisville provides the Commission a strong example of how diversified and consumer-reported data improves understanding of how consumers experience broadband availability.

2. The Commission should collect broadband pricing data

The Commission should collect pricing data for broadband service. Cost is a primary barrier to broadband adoption, and therefore its availability for millions of Americans.[25] Policymakers, advocates, and consumers have long sought this information. There have been calls for the Commission to begin collecting broadband pricing data since

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[22] *See* City of Seattle, *Seattle Broadband Map*,https://broadbandmap.seattle.gov.
[23] *About the Broadband Speed Test*, Seattle Information Technology, https://www.seattle.gov/broadbandspeed-testabout.
[24] SpeedUpLouisville, *SpeedUpLouisville Results,* https://www.speeduplouisville.com/all-results.
[25] *Research Shows Cost is Biggest Barrier to Broadband Adoption*, Benton (Jan. 11, 2016), https://www.benton.org/blog/research-shows-cost-biggest-barrier-broadband-adoption; *Exploring the Digital Nation: Computer and Internet Use at Home,* National Telecommunications and Information Administration (2011); *93 Million Americans Disconnected from Broadband Opportunities*, Federal Communities Commission (Feb. 23, 2010).

at least 2010, including in the Commission's own National Broadband Plan to "collect, analyze, benchmark and publish detailed, market-by-market information on broadband pricing and competition."[26] The Department of Justice reiterated the importance of collecting and analyzing broadband pricing data to assess the health of competition in the market in 2010 as well.[27] The Commission should heed these calls and include a requirement to collect broadband pricing data as part of Form 477.

Yet the Commission, and the federal government writ large, has no reliable measure of how much Americans pay for broadband access at even a national level or how much prices have changed over time. This information vacuum handicaps policymaking at the Commission, Congress, and other agencies that oversee the telecommunications industry.

Cost is a primary barrier to broadband adoption in the United States.[28] Millions of Americans do not have broadband access because it is simply too expensive for them. For example, the Department of Education reported that in 2015, 38% of 3- to 18-year-olds lacked home internet access because it was too expensive.[29] High cost was the most cited reason children in that age group lacked home broadband access, tied with the family

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[26] Federal Communications Commission, Connecting America: The National Broadband Plan, GN Docket No. 09-51, at XI (2010).
[27] Notice of Ex Parte Communications, United States Department of Justice, GN Docket No. 09-51, at 20 (Jan. 4, 2010).
[28] See, e.g., *Exploring the Digital Nation: Computer and Internet Use at Home*, National Telecommunications and Information Administration (2011); *93 Million Americans Disconnected from Broadband Opportunities,* Federal Communications Commission (Feb. 23, 2010).
[29] *Student Access to Digital Learning Resources Outside of the Classroom,* U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics (Apr. 2018), https://nces.ed.gov/pubs2017/2017098.pdf.

deeming broadband unnecessary.[30] The Pew Research Center found that only 53% of Americans surveyed that make less than $30,000 annually had broadband at home, compared to 87% of those who make between $30,000 and $99,999 a year.[31]

The low rate of participation in the Commission's Lifeline program suggests that, even with the $9.25 monthly subsidy, many low-income households still experience obstacles to adopting broadband. Only about 28 percent of the 39 million Lifeline-eligible households actually participated in the program in 2017.[32] There are perhaps several reasons for this lack of participation, but cost is certainly one of them, as prior OTI research shows that a $9.25 monthly subsidy only covers a small portion of the average price of broadband service plans.[33]

Even consumers who can afford broadband internet access are frustrated by the lack of transparency over pricing. Consumer Reports recently reported that American consumers consistently report high dissatisfaction with the cost of their broadband service for being too expensive *and* for including incomprehensible hidden fees.[34]

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[30] *Id.* Sometimes, perceived lack of relevance is often a result of other barriers, including cost. Colin Rhinesmith, *The Complexity of 'Relevance' as a Barrier to Broadband Adoption* Benton Foundation (Jan. 6, 2016), https://www.benton.org/blog/complexity-relevance-barrier-broadband-adoption.
[31] Monica Anderson, *Digital divide persists even as lower-income Americans make gains in tech adoption*, The Pew Research Center, (March 22, 2017), http://www.pewresearch.org/fact-tank/2017/03/22/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/.
[32] *Eligible Lifeline Population Statistics*, Universal Service Administrative Co., https://www.usac.org/li/about/process-overview/stats/default.aspx.
[33] *The Cost of Connectivity 2014*, New America's Open Technology Institute (Oct. 30, 2014), https://www.newamerica.org/oti/policy-papers/the-cost-of-connectivity-2014 (in some major US cities, the least expensive broadband plans were $39.99 per month in 2014).
[34] Consumer Reports, *People Still Don't Like Their Cable Companies, CR's Latest Telecom Survey Finds*, (Aug. 8, 2018).

The rare reporting from the Commission on the topic, from February's International Broadband Data Report (the sixth of its kind), estimated that the average monthly price for fixed standalone broadband products at speeds between 0.2 Mbps and 10 Mbps in the U.S. was $47.08, which means up to $564.96 annually.[35] For 25 Mbps to 100 Mbps, the average monthly price was $61.78 (meaning $741.36 annually).[36] The Commission's findings, however, were estimated using a broadband price index and comparing it to other countries rather than aggregating data collected by broadband providers and consumers to gain a wholesale understanding of how much broadband costs for Americans. This report did not provide detail on how prices differ based on geographic area (whether rural or urban) or whether there is healthy competition in that area. While the publication of the report was a good step, the Commission must collect consistent sets of data to get a better analysis of pricing patterns in the broadband market

III. The Commission should not evaluate deployment on a year-over-year basis

The Commission requests comment on whether it should continue to evaluate high-speed broadband deployment based on a year-over-year analysis instead of evaluating whether all Americans have access to high-speed fixed broadband.[37] OTI prefers the Commission adopt a policy that it seeks to connect all Americans, which

[35] Federal Communications Commission, International Broadband Data Report (Sixth) (Feb. 2, 2018), Appendix C, Table 1b, www.fcc.gov/reports-research/reports/international-broadband-data-reports/international-broadband-datareport-4
[36] *Id.*
[37] *Id.*

should be reflected in the Section 706 inquiries. However, should the Commission continue to employ a year-over-year analysis, it must define the contours of that analysis.

In 2018, the Commission departed from prior interpretations of Section 706. Before then, the Commission looked at the raw number of Americans with and without broadband connections to make the Section 706 determination.[38] The 2018 report, however, changed the analysis to a year-over-year comparison based on its reading of the statute.[39] The Commission's argument was that the use of the present progressive tense ("is being deployed") in Section 706 suggests that it a year-over-year analysis was more appropriate than determining whether advanced telecommunications services *has actually been* deployed to all Americans.

As an initial matter, the year-over-year analysis will become a self-fulfilling prophecy. Broadband providers invest in their networks constantly, and new housing is being built throughout the U.S. constantly, resulting in more deployment. Every year, there will be more deployment.[40] Even during 2014-2016, the years Chairman Pai attributes

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[38] In previous Broadband Progress Reports released in recent years, the Commission has found that advanced telecommunications capability was not being deployed to all Americans in a reasonable and timely fashion, due to the "the lack of availability of fixed broadband services and the Reports also included an assessment of factors indicative of fixed broadband availability, including physical deployment, broadband price, quality, and adoption by consumers." 2016 Broadband Progress Report, GN Docket No. 15-191, (Jan. 28, 2016), ¶ 9 ("2016 Broadband Progress Report); *2015 Broadband Progress Report*, 30 FCC Rcd at 1378, ¶ 4; see also *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, GN Docket No. 11-121, Eighth Broadband Progress Report, 27 FCC Rcd 10342, 10344, 10350, ¶ 1, 9 & n.47 (2012).

[39] 2018 Broadband Deployment Report, ¶ 10.

[40] It is possible that natural disasters could affect these numbers and potentially decrease total deployment numbers, but even that is still unlikely.

depressed investment because of the 2015 Open Internet Order, deployment *still* increased.[41] Congress likely knew that such an analysis would always trend positively, meaning it is unlikely Congress intended Section 706 to require only a year-over-year review. Thus, the Commission should not place undue weight on year-over-year changes in deployment metrics.

Regardless of the merits of the Commission's new interpretation, the Commission should still consider and analyze the raw numbers of connected Americans. The latest data shows 24 million Americans lack access to a high-speed broadband connection, many of whom are in rural areas. That is simply unacceptable, and the Section 706 analysis should continue to reflect that this number is simply too high.

If the Commission retains the year-over-year analysis, however, it must define the contours of that analysis before making the decision that a certain percentage increase is sufficient for Section 706. Currently, the Commission is using a vague goal of "progress" that does not have any specific parameters. And prior year-over-year analysis leaves much to be desired. For instance, how much improvement in deployment numbers is the Commission looking for from one year to the next to deem deployment "reasonable and timely"? How will the Commission determine whether the increase actually resulted in expansion of access (did some ISPs merely expand to single households across several census tracts to deem those areas "deployed," or did they actually increase their footprint substantially)? Do other metrics like throughput have to improve over the year too? How

[41] 2016 Broadband Progress Report, ¶ 50, Table 1.

does access (pricing, actual adoption numbers) play into the Commission's finding from one year to the next? These questions need answers before the Commission can make an informed and consistent Section 706 determination.

IV. The Commission should not consider one provider adequate competition for "reasonable and timely" broadband deployment

Competition is critical in ensuring broadband gets deployed to all Americans. The Commission's 2018 Report measures broadband deployment by taking the summation of populations across all census blocks with at least one BIAS provider. This approach is flawed. Instead, in its upcoming report, the Commission should determine the number of Americans with BIAS access by utilizing a tiered approach that reports the population of Americans with one, two, and three or more BIAS providers at 25/3 Mbps, as it did in the 2017 Restoring Internet Freedom Order.[42]

A one-provider threshold wrongly suggests that one provider is an adequate baseline for reasonable and timely broadband deployment; it also obscures the relevance of competition. Many commenters have established that competition promotes broadband deployment.[43] A recent report from the Institute for Local Self Reliance found that where BIAS providers do not compete with each other, they appear to invest only the minimum required by the Connect America Fund, whereas in areas where they do compete, they

[42] Restoring Internet Freedom Order, WC Docket No. 17-108, at ¶ 124-125, https://www.fcc.gov/document/fcc-releases-restoring-internet-freedom-order.
[43] *See e.g.*, OTI et al. Fixed Competition Comments.

invest additional funds to improve their networks.[44] Competition is an important indicator of network investment and quality. The Commission's previous methodology obscured this fact by only measuring the number of Americans with at least one BIAS provider.

The Commission must measure the number of Americans who have only one or only two options for BIAS providers. According to the Center for Public Integrity, BIAS providers "appear to carve up territory to avoid competing with more than one other provider."[45] In other proceedings before the Commission, INCOMPAS has argued that a duopoly should not be considered sufficient competition.[46] INCOMPAS cites scholar and former Chief Economist for the Federal Communications Commission David E. M. Sappington, who states that "it is generally inappropriate to rely on duopoly competition to protect consumers."[47] Other economists have suggested that two suppliers in a market may enable tacit collusion and the empirical evidence that prices are higher in concentrated market.[48]

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[44] *Profiles of Monopoly: Big Cable and Telecom* at 2, Inst. for Local Self-Reliance (July 2018), https://ilsr.org/wp-content/uploads/2018/07/profiles-of-monopoly-2018.pdf. ("Despite the Connect America Fund, the large providers have rarely invested in next-generation services in areas where they do not face competition… Large firms appear to invest in modern networks solely where they face competition and provide the minimum allowable under subsidy programs elsewhere.").

[45] Allan Holmes & Chris Zubak-Skees, *U.S. Internet users pay more and have fewer choices than Europeans*, Center for Public Integrity (April 1, 2015), https://www.publicintegrity.org/2015/04/01/16998/us-internet-users-pay-more-and-have-fewer-choices-europeans.

[46] *See* Comments of INCOMPAS, GN Docket No. 18-231 (Aug. 17, 2018), at 16, https://ecfsapi.fcc.gov/file/1081710079256/FINAL%20INCOMPAS%20Fixed%20Broadband%20Competition%20Comments%208.17.18.pdf.

[47] Opposition of INCOMPAS, FISPA, Midwest Association of Competitive Communications, and the Northwest Telecommunications Association, Attachment 1, Declaration of David E.M. Sappington, WC Docket No. 18-141 (Aug. 6, 2018), at 9-10, https://ecfsapi.fcc.gov/file/10806210367023/Attachment%201%20-%20Sappington%20INCOMPAS%20Report%20%5BREDACTED%5D.pdf.

[48] *Id.*

The Commission should not assess broadband deployment at a threshold below 25/3. While industry participants like the NCTA—the Internet & Television Association (NCTA) have argued that BIAS services below 25/3 would be sufficient for consumers, these claims overlook the fact that households today contain multiple devices that require access to broadband.[49] A Pew Research Center survey conducted in fall 2016 found that the typical American household contains five devices.[50] Moreover, nearly one-in-five American households (18%) contain at least ten devices.[51] While throughput below 25/3 may be sufficient for a single device, households generally require at least 25 Mbps download capacity to facilitate stable internet access from multiple devices simultaneously.[52] Furthermore, internet users require upload speeds of at least 3 Mbps. For instance, livestream camera company Mevo recommends a minimum upload speed of 5 to 10 Mbps for a single device when using its products.[53]

V. Mobile BIAS remains only a complement, not a substitute, to fixed BIAS

The Commission asks "whether and to what extent fixed and mobile services of similar functionality are substitutes for each other."[54] As OTI detailed in comments last

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[49] Comments of NCTA—the Internet & Television Association, GN Docket No. 18-231 (Aug. 17, 2018), at 5 , https://ecfsapi.fcc.gov/file/1081785710052/081718%2018-231%20Comments.docx.
[50] Kenneth Olmstead, *A third of Americans live in a household with three or more smartphones*, Pew Research Center (May 25, 2017), http://www.pewresearch.org/fact-tank/2017/05/25/a-third-of-americans-live-in-a-household-with-three-or-more-smartphones/.
[51] *Id.*
[52] *See Why 25 Mbps/3 Mbps is a reasonable minimum standard in 2018*, Muni Networks (May 30, 2018), https://muninetworks.org/content/why-25-mbps-3-mbps-reasonable-minimum-standard-2018.
[53] *What Internet Speed Do I Need to Stream?*, Mevo (July 22, 2018), https://help.getmevo.com/hc/en-us/articles/223198268-What-Internet-Speed-Do-I-Need-to-Stream-.
[54] Fourteenth Broadband Deployment Report 2018 Section 706 Notice Of Inquiry, GN Docket No. 18-238 (Aug. 9, 2018), ¶ 11.

year, mobile BIAS is not a substitute for fixed BIAS as mobile is generally more expensive, less reliable (particularly in rural areas), slower, and governed by data caps and expensive overage fees.[55] The Commission agreed in its 2018 *Broadband Deployment Report* that mobile services are not full substitutes for fixed service.[56]

Nothing substantial has changed since the Commission's last Section 706 report, and the Commission should conclude, as it did earlier this year, that mobile BIAS is a complement, not a substitute, to fixed BIAS. There have been no significant changes in mobile broadband technology over the past year that require the Commission to change course on the adequacy of mobile broadband to serve as a substitute for fixed broadband. Commenters might argue that the coming of mobile 5G networks marks a big enough change that these networks will provide a substitute to fixed broadband—the Commission should ignore these hyperbolic and premature claims.

A. Mobile BIAS is still not a substitute for fixed BIAS

Mobile broadband services are complementary to fixed broadband service, but at this time mobile is not a viable substitute.[57] The way companies market the two distinct products and the way consumers purchase and use them reinforce the reality that the two

[55] New America's Open Technology Institute Comments, GN Docket No. 17-199, (Sep. 21, 2017), https://ecfsapi.fcc.gov/file/10921256530521/OTI%20FCC%20Section%20706%20Comments.pdf; New America's Open Technology Institute Reply Comments, GN Docket No. 17-199, (Oct. 6, 2017), https://ecfsapi.fcc.gov/file/1006003159531/OTI%20Section%20706%20Reply%20Comments%20Final.pdf.
[56] 2018 Broadband Deployment Report, ¶ 18.
[57] "Where rural and other areas have access to both fixed and mobile services, WTA and its members have long found, and continue to find, that such services are far more complementary than competitive with each other." Comments of WTA—Advocates for Rural Broadband, GN Docket No. 18-231 (Sept. 10, 2018), at 1.

are not substitutes. Mobile BIAS is marketed and consumed as a product distinct from fixed BIAS, mainly due to the very limited amount of mobile data that can be used before carriers charge overage fees or drastically slow customers' speeds.[58] Mobile BIAS plans include data caps, limited bandwidth capacity, and unique pricing models that are foreign to the market of fixed BIAS providers because the two services meet different consumer needs.[59] Fixed BIAS offers users the ability to use high-speed internet access at home for work, education, and other needs. Fixed BIAS also enables consumers to rely on Wi-Fi to offload the vast majority of mobile device data traffic for high-bandwidth applications, such as video streaming, that would put most consumers over mobile carrier 'soft caps' that are triggered at a fraction of the average household's monthly total data consumption. Consumers pay for mobile BIAS almost exclusively for on-the-go use away from fixed BIAS connections via Wi-Fi for more immediate and lower-bandwidth needs such as email, search, maps, and low-definition video streaming.[60]

Consumer behavior reflects the fact that they see mobile and fixed broadband as two distinct products that serve separate needs. The Commission acknowledged this in its 2018 *Broadband Deployment Report*: "There are clear variations in consumer preferences and demands for fixed and mobile services."[61] One survey found that 63% of respondents

[58] 2016 Broadband Progress Report, ¶ 33-34.
[59] *Id.* at ¶ 31.
[60] New America's Open Technology Institute Reply Comments, GN Docket No. 17-199 (Oct. 6, 2017), https://ecfsapi.fcc.gov/file/1006003159531/OTI%20Section%20706%20Reply%20Comments%20Final.pdf.
[61] 2018 Broadband Deployment Report, ¶ 18.

said they were "not likely at all" to cancel home broadband and go mobile-only.[62] To illustrate that point, as the Commission noted in its 2016 *Broadband Progress Report,* studies show consumers generally buy both fixed *and* mobile broadband services when they have the means to do so.[63] Americans who are mobile-only broadband users currently are mostly low-income, suggesting that people only use mobile as a substitute for fixed broadband when that is their only option due to price. In 2018, 31% of Americans making less than $30,000 per year surveyed reported owning a smartphone, but having no broadband at home, compared to just 9% of those making $75,000 or more annually.[64] Americans suffer the limited bandwidth, uneven indoor connectivity, small screen size, and very limited data allowances associated with mobile networks only when they are economically compelled to do so.

Mobile BIAS is not a functional substitute to fixed BIAS particularly in the employment context. Nearly half of Americans surveyed by the Pew Research Center who had used a smartphone as part of a job search experienced problems accessing content that did not display properly on the phone and reading job content not optimized for mobile use.[65] Work requires not only a stronger connection but also requires the device to

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[62] *See* John Horrigan, *Smartphones and Broadband: Tech users see them as complements and very few would give up their home broadband subscription in favor of their smartphone* (Nov. 2014), at 8, https://www.publicknowledge.org/assets/uploads/blog/Smartphones_and_Broadband.pdf.
[63] 2016 Broadband Progress Report, ¶ 31 ("This finding is also strongly supported by the preferences and purchasing decisions of American consumers, who overwhelmingly adopt both services when they have the means.").
[64] *Internet /Broadband Fact Sheet*, Pew Research Center (Feb. 5, 2018), http://www.pewinternet.org/factsheet/internet-broadband.
[65] Monica Anderson and John B. Horrigan, *Smartphones help those without broadband get online, but don't necessarily bridge the digital divide*, Pew Research Center (Oct. 3, 2016) http://www.pewresearch.org/fact-tank/2016/10/03/smartphones-help-those-without-broadband-get-online-but-dont-necessarily-bridge-the-

engage with the content. Mobile devices offer portability for consumers, but not the experience necessary to do long or arduous work. The difficulties experienced by users reliant on a mobile broadband connection—such as students writing essays and completing homework using a smartphone—were highlighted by the "mobile-only challenge" earlier this year.[66]

The limitations of mobile BIAS identified by OTI in last year's Section 706 proceeding—and cited by the Commission in its 2018 *Broadband Deployment Report* deeming mobile and fixed not substitutes—have not changed. Households use exponentially more data over fixed BIAS than they reasonably could afford to use over mobile BIAS due to data caps or thresholds. Even under so-called "unlimited plans" by the two largest mobile carriers, consumers would experience significant overage costs or receive drastically throttled service if they were to consume even one-third as much data over mobile as they do fixed BIAS. This difference translates into a cost per gigabyte that is at least five-to-ten times higher for mobile, reinforcing once again that those who can afford both buy both. Differences between mobile and fixed BIAS average throughput are drastic, and mobile BIAS is generally much less reliable and resilient than fixed BIAS, particularly in rural areas.[67]

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digital-divide/ (37 percent of respondents said they had trouble submitting required files or supporting documents as part of their job application process over their smartphone).

[66] Linda Poon, *Could You Live Entirely on Mobile Internet? Try It for a Day*, City Lab (Jan. 17, 2018), https://www.citylab.com/equity/2018/01/mobile-only-challenge-fcc-broadband-definition/550202/.

[67] New America's Open Technology Institute Comments, GN Docket No. 17-199 (Sep. 21, 2017), https://ecfsapi.fcc.gov/file/10921256530521/OTI%20FCC%20Section%20706%20Comments.pdf at 5-17.

Additionally, mobile service is "intermittent, spotty or nonexistent" in rural areas.[68] Even in places where Americans conceivably do have *some* service, it can be nearly impossible to use depending on time of day or location, as Sen. Jon Tester stated in a recent Senate hearing.[69] These mobile connections are not of sufficient quality to be considered a substitute for fixed broadband.

Even so-called "unlimited" mobile broadband plans do not provide the data that the average household consumes with fixed broadband connections. All four major mobile carriers use "soft caps" for all their "unlimited" data plans, where users have a ceiling of how much data they can use before the carrier reserves the right to slow down their service or incur overage fees.[70] While Verizon's "Above Unlimited" has the highest data cap for "unlimited" at 75 gigabytes (GB) before it can start throttling a customer's connection, that is still less than half of what the average household uses over a fixed BIAS connection monthly. Other plans, such as that of AT&T, allow for even less data use before throttling or overage fees kick in, with their cap set at 22 GB. According to iGR Research, the average monthly broadband usage in U.S. households is 190 gigabytes per month in 2016.[71] According to Xfinity, the median monthly data usage for its internet

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[68] Comments of WTA – Advocates For Rural Broadband, GN Docket No. 18-238, (Sep. 10, 2018), https://ecfsapi.fcc.gov/file/1091035104328/WTA%20Broadband%20NOI%20Comments%20September%202018.pdf at 1.

[69] *Id.*

[70] Todd Haselton, *Your phone's unlimited data plan isn't really unlimited — this is what you really get,* CNBC (July 14, 2018), https://www.cnbc.com/2018/07/13/unlimited-data-plan-caps-verizon-att-tmobile-sprint.html.

[71] Joan Engebretson, *iGR: Average Monthly Broadband Usage is 190 Gigabytes Monthly Per Household*, Telecompetitor (Sept. 26, 2016), https://www.telecompetitor.com/igr-average-monthly-broadband-usage-is-190-gigabytes-monthly-per-household/ (citing to a subscription-only report from iGR Research,

customers was 151 GB per month from January to June 2018.[72] It is simply unreasonable to expect consumers to substitute their fixed broadband connections with mobile broadband connections.

Further, mobile broadband connections rely heavily on fixed broadband for backhaul, and cannot be considered a substitute for fixed while being dependent on it. Consumers who opt to abandon their fixed broadband plans for mobile broadband would find themselves without the key supplement to a mobile broadband connection—a Wi-Fi connection at home. Mobile device data traffic transported over Wi-Fi networks, instead of over mobile carrier networks, is increasing and exceeds all other wireless technologies. More internet data goes over just 540 MHz of unlicensed spectrum in the 2.4 GHz and 5 GHz unlicensed bands used by Wi-Fi than *any* other wireless technology or service, and usage is predicted to keep increasing at a rapid rate.[73] As of 2016, at least 60 percent of total mobile data traffic was offloaded onto fixed networks using Wi-Fi or femtocell,

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https://igrinc.com/advisory-subscription-services/wireless-mobilelandscape/us_home_broadband_wifi_forecast_2020.asp).

[72] *What is the median usage of people on your network today?*, Xfinity, https://www.xfinity.com/support/articles/data-usage-average-network-usage.

[73] Comments of All Points Broadband, Amplex Internet, Apple, Blaze Broadband, Broadcom, Cambium Networks, Cisco Systems, Cypress Semiconductor, Dell, Extreme Networks, Facebook, Fire2Wire, Google, Hewlett-Packard Enterprise, HP, Intel, Joink, MediaTek, Metalink Technologies, Microsoft, New Wave Net, Pixius Communications, Qualcomm, Rise Broadband, Ruckus, A Unit of Brocade, Snappy Internet, Sony Electronics, Western Broadband, Wireless Internet Service Provider Association, Wisper ISP, GN Docket No. 17-183, at 5.

according to Cisco.[74] Other reports have found that smartphone and tablet users are dependent on Wi-Fi to ensure fast mobile connectivity.[75]

B. The Commission's inquiry should not consider mobile 5G networks

The Commission asks commenters to consider "the extent that mobile services are able to offer equivalent functionality as fixed services *either now or in the future.*"[76] As detailed above, no technological changes in the past year have resulted in mobile BIAS becoming a substitute for fixed BIAS. However, the inclusion of "in the future" in the question is concerning, particularly given the hype around mobile 5G networks.[77] OTI strongly urges the Commission to ignore hyperbolic and premature claims that mobile 5G services will substitute or replace fixed broadband services and take a wait-and-see approach when reviewing its potential impact on the broadband ecosystem when the technology is actually deployed at a large enough scale.

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[74] *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2016–2021 White Paper*, Cisco (March 28, 2017), https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visualnetworkingindex-vni/mobile-white-paper-c11-520862.html ("Of all IP traffic (fixed and mobile) in 2021, 50% will be WiFi, 30% will be wired, and 20% will be mobile.").

[75] *Global State of Mobile Networks*, Open Signal (February 2017), available at https://opensignal.com/reports/2017/02/global-state-of-the-mobile-network. ("In general though, we see a high proportion of time spent on Wifi in the majority of the 96 countries we analyzed. Specifically, 38 of those countries had time on Wifi scores of 50% or greater, meaning in a large part of the world our users are spending as much time connected to Wifi networks as they are cellular networks. Rather than acting as a mere supplement to 4G networks, Wifi remains as important a technology as any cellular system in mobile communications.").

[76] 2018 Broadband Deployment Report ("2018 Broadband Deployment Report"), GN Docket No. 17-199, (Feb. 2, 2018), ¶ 11.

[77] T-Mobile and Sprint Description of Transaction, Public Interest Statement, and Related Demonstrations, WT Docket No. 18-197, (June 18, 2018), https://ecfsapi.fcc.gov/file/1061828100624o/Public%20Interest%20Statement%20and%20Appendices%20A-J%20(Public%20Redacted)%20.pdf.

Mobile 5G networks and technology are still years away from being deployed on a wide scale.[78] Thus, it is impossible for the Commission to determine if mobile 5G will truly be an adequate substitute for fixed. The first deployments at scale are not expected until 2020 at the earliest,[79] while some analysts estimate that large-scale deployment of well-functioning 5G services will not actually occur until 2022 or 2023.[80] Uncertainties around 5G still exist, including what the technology and business model to justify widespread deployment will even look like.[81] The Commission should not take into account potential for 5G as part of its Section 706 inquiry.

Further, even when mobile 5G networks are realized, they are still unlikely to provide an actual substitute for fixed broadband. Providers often tout "fiber-like" speeds of 5G,[82] those will only (or mostly) happen in urban, highly densely-populated areas.

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[78] *See*, e.g., Statement of FCC Chairman Tom Wheeler, Use of Spectrum Bands Above 24 GHz for Mobile Radio Services, GN Docket No. 14- 177 (July 14, 2016), https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-89A2.pdf.

[79] Klint Finley, *Does It Matter If China Beats The US To Build A 5G Network?* Wired (June 6, 2018), https://www.wired.com/story/does-it-matter-if-china-beats-the-us-to-build-a-5g-network/, ("Carriers don't expect national availability in the US until 2020. The wireless industry promises that 5G will bring enormous boosts in speed and reliability to mobile devices, bridge the gap between wireline and wireless broadband speeds, and enable a new wave of technologies and applications that we can't even imagine yet.").

[80] *5G: Known unknowns*, New Street at 8 (Apr. 17, 2016), www.newstreetresearch.com/download/5G%20April%202016%20slides.pdf

[81] Common Cause, Public Knowledge, Center for Rural Strategies, and the Benton Foundation Comments, GN Docket No. 18-231 (Aug. 17, 2018), https://ecfsapi.fcc.gov/file/10817100166585/Common%20Cause%20etl%20al%20Wireline%20Competition%20Comments%20FINAL%208-17-18.pdf at 5-6 ("The various deployment plans mean 5G will have a broad range of functionalities across multiple spectrum bands, giving consumers varying degrees of service. These uncertainties add more credence that the Commission should not treat 5G as a substitute for fixed broadband.").

[82] T-Mobile and Sprint Description of Transaction, Public Interest Statement, and Related Demonstrations, WT Docket No. 18-197 (June 18, 2018), https://ecfsapi.fcc.gov/file/1061828100624o/Public%20Interest%20Statement%20and%20Appendices%20A-J%20(Public%20Redacted)%20.pdf.

Rural and less-dense suburban communities will be largely left behind by the mobile 5G revolution, partially due to the propagation characteristics of the millimeter wave spectrum being licensed for mobile 5G, but also because of the prohibitive cost of deploying mobile 5G outside of urban areas with high population densities.[83]

Additionally, even as mobile carriers turn their focus on building and promoting 5G, many rural areas are still waiting to get 4G LTE service.[84] In a recent Senate hearing, Sen. Jon Tester discussed the difficulties of convincing mobile carriers to bring 5G wireless services in Billings, Montana's largest city.[85] Sen. Tester also noted that many parts of Montana currently have "no G" service, and do not expect to get substantial wireless service anytime soon.[86] A bipartisan group of 30 senators recently raised the alarm that the push for rural connectivity is moving too slowly, calling attention to Chairman Pai that the Mobility Fund Phase II Support map "falls short of an accurate depiction of areas in

[83] Comments of New America's Open Technology Institute, the Institute for Local Self-Reliance, National Association of Telecommunications Officers and Advisors, National League of Cities, and Next Century Cities, GN Docket No. 18-231, (Aug. 17, 2018), https://ecfsapi.fcc.gov/file/10817788202976/FCC%20Fixed%20Broadband%20Competition%20Comments%20of%20OTI%20ILSR%20NLC%20NCC%20NATOA.pdf at 21-23 ("Signals in the millimeter wave spectrum being set aside for 5G propagate at very short distances and are particularly vulnerable to weather and other natural obstacles such as foliage. These characteristics mean that 5G service will depend on an extensive network of small cells that are deployed in close proximity to each other—all of which makes 5G poorly suited for less dense, leafy areas... The cost of deploying 5G service to rural areas will also be a major obstacle. New Street found that Verizon's plan to use small cells to build out backhaul for its mobile 5G network will require 360,000 nodes, take 5 to 8 years, and cost $35 billion.").

[84] Ajit Pai, *Bridging the Digital Divide*, FCC Blog (July 13, 2017), https://www.fcc.gov/newsevents/blog/2017/07/13/bridging-digital-divide, ("...You can't even get 4G LTE wireless service on more than 7,700 road miles in rural parts of the same state. And this is unfortunately common nationwide.").

[85] Comments of WTA—Advocates for Rural Broadband, GN Docket No. 18-231, (Sep. 10, 2018).

[86] *Id.*

need of universal service support."[87] Even where carriers claim they provide LTE service might be inaccurate. A recent filling raised concern about Verizon allegedly "grossly overstating" its 4G coverage, particularly in rural areas.[88] While rural areas still await 4G LTE service, there is little reason to expect mobile carriers to leapfrog 4th Generation technology and bring fiber-like mobile 5G speeds to rural areas as a substitute to fixed broadband.

VI. The Commission should increase its throughput benchmarks

OTI again encourages the Commission to increase its throughput benchmarks.[89] We applaud Commissioner Rosenworcel's recommendation to move the national broadband standard from 25 Mbps to 100 Mbps.[90] The Commission should look toward future consumer needs in setting throughput benchmarks, and move toward a symmetrical throughput benchmark for download and upload.

Fixed BIAS throughput has increased rapidly at exponentially faster rates each year, and the Commission should recognize this trend in its Section 706 inquiry. Measurement Lab (M-Lab) has found that from 2012 to 2014, average internet throughput

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[87] Letter from Senators Wicker, Hassan, et al., to Ajit Pai, Chairman, FCC (May 30, 2018), https://docs.fcc.gov/public/attachments/DOC351493A2.pdf ("Wicker/Hassan Letter") ("Communities in our states that are not initially eligible or successfully challenged will be ineligible for up to $4.53 billion in support over the next 10 years, exacerbating the digital divide and denying fundamental economic and safety opportunities to rural communities.").

[88] Informal Request of The Rural Wireless Association, Inc. For Commission Action, WC Docket No. 10- 90 at 3 (Aug. 6, 2018).

[89] *See* Comments of the Open Technology Institute at New America at 22-24, GN Docket No. 17-199 (Sept. 21, 2017).

[90] Fourteenth Broadband Deployment Report Notice of Inquiry, GN Docket No. 18-238 (Aug. 9, 2018), Dissenting Statement of Jessica Rosenworcel.

in the U.S. improved at a rate of .23 Mbps annually.[91] From 2015 to 2017, it found that average internet speeds in the U.S. improved at a rate of 1.9 Mbps annually.[92] Most recently, M-Lab found that the average internet speed in the U.S. is 25.86 Mbps, an improvement of 5.86 Mbps from 2017 to 2018.[93] Moreover, Ookla (Speedtest) has found that in 2018, average fixed BIAS speeds in the U.S. were already at 96.91 Mbps download and 32.86 Mbps upload.[94] NCTA touts that cable speeds continue to increase every year.[95] With global average fixed broadband speeds at 46.41 Mbps download and 22.48 Mbps upload in 2018, keeping the national broadband standard at 25/3 leaves the U.S. significantly behind the rest of the world.[96] The Commission should increase its throughput benchmarks accordingly.

The latest online innovations continue to require increased throughput. While consumers are gaining more options for 4K streaming, many broadband connections lack the speeds necessary for reliable 4K streaming.[97] For a typical household with multiple devices accessing broadband simultaneously, 15 or 25 Mbps is not enough for 4K

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[91] Reply Comments of the Open Technology Institute at New America at 38, Dkt. No. 17-108 (Aug. 30, 2017) (citations removed).
[92] *Id.*
[93] *Worldwide broadband speed league 2018*, Cable, https://www.cable.co.uk/broadband/research/worldwide-broadband-speed-league-2018/#regions.
[94] *Speedtest Global Index*, United States, Speedtest.net (July 2018), http://www.speedtest.net/global-index/united-states#fixed.
[95] *Broadband by the Numbers*, NCTA, https://www.ncta.com/broadband-by-the-numbers.
[96] *Speedtest Global Index, United States*, Speedtest.net (July 2018), http://www.speedtest.net/global-index/united-states#fixed.
[97] Rob Pegoraro, *You're buying a 4K TV. How much Internet bandwidth do you need?*, USA Today (Dec. 10, 2017), https://www.usatoday.com/story/tech/columnist/2017/12/10/youre-buying-4-k-tv-how-much-internet-bandwidth-do-you-need/933989001/.

streaming.[98] As OTI has detailed in its 2017 Section 706 inquiry proceeding, the growing markets in online video game distribution and gaming, eSports and live sports coverage, and cloud storage continue to require increased throughput benchmarks.[99]

The Commission should move toward a symmetrical throughput benchmark that prioritizes download and upload throughput, as internet consumers also create content. Many popular services and apps require upload capability, particularly for video upload or streaming purposes.[100] Upload throughput is also essential to people's exercise of free speech, and is particularly important to social movements led by historically marginalized communities. Digital tools, such as email, social media, and video conferencing, and upload capability are integral to the ability of these movements to mobilize their base and grow their constituencies.[101]

VII. The Commission should study the effects of natural disasters on communications networks and include those effects in its Section 706 findings

The Commission requests comment on "how to address natural disasters in reporting on the progress of deploying broadband," and specifically cites the destruction left by Hurricanes Irma and Maria.[102] As the Commission notes, those two hurricanes caused an estimated $1.5 billion of damage to Puerto Rico's communications network, and the island is still recovering from the destruction caused to electricity sources, the

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[98] *Id.*
[99] Comments of the Open Technology Institute at New America at 22-23, GN Docket No. 17-199 (Sept. 21, 2017).
[100] For example, Twitch, Youtube, Facebook Live, Instagram, and Snapchat require upload capability.
[101] *See Digital Culture Shift,* Center for Media Justice (Aug. 2015), http://centerformediajustice.org/wpcontent/uploads/2015/08/digital_culture_shift_report.pdf at 7.
[102] Fourteenth Broadband Deployment Report Notice Of Inquiry, GN Docket No. 18-238 (Aug. 9, 2018), ¶ 15.

devastation to infrastructure, and the widespread deaths it caused.[103] To better understand and inform its decisions, the Commission should study the effects of natural disasters on communications networks, and include those effects in its Section 706 findings.

Natural disasters cause devastating damage to communications networks. They can have long-lasting effects on people living in the area. In particular, Puerto Rico still suffers from the widespread devastation from the Hurricanes Irma and Maria. Damage to infrastructure generally also affects the ability of communications networks to be rebuilt and used. In December, months after Hurricane Maria hit, 60,000 houses were estimated to still be roofless.[104] Heavy rains and floods damaged housing and collapsed bridges and not even 1% of Puerto Rican homeowners have flood insurance.[105] Given the severity of the damage to the island, Puerto Ricans who already did not have sufficient (or any) access to broadband will be even less able to commit toward securing reliable communications infrastructure.[106] The Commission should take these factors into account.

The Commission should take natural disasters into consideration when conducting its Section 706 review. When a natural disaster destroys broadband infrastructure, that destruction should be reflected in the Section 706 inquiries. That broadband is no longer

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[103] *Id.*; Letter from Sandra. E. Torres López, Chairwoman, Puerto Rico Telecommunications Regulatory Board, to Ajit Pai, Chairman, FCC, WC Docket No. 10-90, at 1 (filed Dec. 13, 2017); Sheri Fink, *Puerto Rico's Hurricane Maria Death Toll Could Exceed 4,000, New Study Estimates*, N.Y. Times (May 29, 2018), https://www.nytimes.com/2018/05/29/us/puerto-rico-deaths-hurricane.html.
[104] Emma Schwartz, *Quick Facts: Hurricane Maria's Effect on Puerto Rico*, Mercy Corps (Jan. 19, 2018), https://www.mercycorps.org/articles/united-states/quick-facts-hurricane-marias-effect-puerto-rico.
[105] *Id.*
[106] Comments of New America's Open Technology Institute, WC Docket No. 17-287, (Feb. 21, 2018) at 37.

"deployed." Efforts to rebuild that infrastructure should be prioritized at the Commission and should be reflected in the relevant broadband progress report. Given the annual nature of the broadband progress report, it is likely that in the near future, those numbers would be corrected when the repairs to the communications networks are complete. The Commission should, however, ensure that everyone who had access before the disaster has it after the disaster, at that point providers could then resume building out to new areas.

The Commission should spend the resources and time necessary to analyze the state of broadband deployment in areas recently hit by natural disasters, and prioritize USF funding to these areas to help rehabilitate communications networks following destructive storms. The Commission recently released a 2017 Atlantic Hurricane Season Report, which is a welcome start to stronger natural disaster analysis.[107] However, since the Commission is analyzing broadband deployment every year across the country, it should study the impacts of natural disasters on the areas hit as well. Additionally, an analysis of the fixed and mobile services taken down during the storms should help the Commission's targeted efforts funding and assisting in the rebuilding of infrastructure. These efforts would be helped significantly by holding field hearings.[108]

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[107] *2017 Atlantic Hurricane Season Impact on Communications Report and Recommendations*, Public Safety Docket No. 17-344 (August 2018), https://docs.fcc.gov/public/attachments/DOC-353805A1.pdf ("Atlantic Hurricane Season Report").

[108] *Statement of Commissioner Jessica Rosenworcel in Response to FCC's 2017 Atlantic Hurricane Season Report*, Aug. 24, 2018, https://docs.fcc.gov/public/attachments/DOC-353808A1.pdf.

VIII. The Commission should remove barriers to municipal networks

The Commission seeks comment on "the ongoing effects of these efforts in spurring broadband deployment and additional efforts the Commission might undertake."[109] As OTI has argued in other proceedings before the Commission, multiple states have laws that prohibit or restrict the creation of community networks.[110] These laws pose significant regulatory barriers to investment that "unnecessarily delay a provider's broadband buildout … [and] impede wireless infrastructure projects to deploy advanced networks."[111]

Where some communities are unserved or underserved by private ISPs, the community itself has bridged the gap by investing in its own networks to bring broadband to residents and local businesses. These municipal networks are often faster and cheaper than services offered by incumbent ISPs in large cities.[112] Municipal broadband has been especially successful in rural communities, where population density and infrastructure issues do not provide optimal economic incentives for private ISPs.[113]

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[109] Fourteenth Broadband Deployment Report Notice Of Inquiry, GN Docket No. 18-238 (Aug. 9, 2018),¶ 23.
[110] *See* Comments of New America's Open Technology Institute, The Institute for Local Self Resilience, National Association of Telecommunications Officers and Advisors, National League of Cities, and Next Century Cities, GN Docket No. 18-231, WC Docket No. 18-141, and GN Docket No. 17-142, at 8-13 (Aug. 17, 2018).
[111] Fourteenth Broadband Deployment Report Notice Of Inquiry, GN Docket No. 18-238 (Aug. 9, 2018), ¶ 24.
[112] David Talbot, Kira Hessekiel, and Danielle Kehl, *Community-Owned Fiber Networks: Value Leaders in America*, Berkman Klein Center for Internet & Society at Harvard University (Jan. 10, 2018), available at https://cyber.harvard.edu/publications/2018/01/communityfiber.
[113] *Delivering Broadband to Rural America: Community Broadband Initiatives*, Telequality Communications (April 17, 2017), https://www.telequality.com/blog/2017/4/17/delivering-broadband-to-rural-america-community-broadband-initiatives.

Despite these benefits, approximately 20 states have passed laws that restrict or prohibit municipal broadband.[114] These laws can be broadly categorized as follows: (1) bureaucratic barriers, (2) prohibition on the direct sale of broadband by the local government, (3) prohibitive referendum requirements, (4) limiting the service area of a municipal network through population caps or territory limits, (5) excessive taxation on municipal services.[115] These anti-municipal broadband laws delay, inflate the costs of, or even preclude municipal broadband, which then prevent consumers from realizing the competitive benefits of these networks.

The Commission should view these laws as anathema to the idea of broadband competition. It has repeatedly argued that closing the digital divide is one of its top priorities, but particularly in rural areas where it is expensive to build infrastructure, municipalities (which are less dependent on earning profits) could provide a smart solution. The Commission's previous attempts to preempt such state laws were met with legal challenges from certain states, yet it should still use its considerable expertise and capital to work with state legislatures to remove these barriers to municipal broadband to help bridge the digital divide.

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[114] *Municipal Broadband is Roadblocked or Outlawed in 20 States*, Broadband Now (April 3, 2018), available at https://broadbandnow.com/report/municipal-broadband-roadblocks/.
[115] *Id.*

IX. The Commission should utilize spectrum-sharing frameworks and unlicensed spectrum to improve broadband deployment

The Commission requests comment on its ongoing proceedings that seek to "expand access to spectrum to support or supplement wireless and satellite broadband services" through mid-band and high-band spectrum, as well as other ways to implement spectrum policies to improve broadband.[116] OTI is participating in several proceedings on these topics and has called on the Commission to support existing new spectrum-sharing frameworks, and implement new ones, as well as to free up unlicensed spectrum to facilitate more cost-effective broadband deployment and connectivity. In particular, the Commission should retain its Citizens Broadband Radio Service rules governing the 3.5 GHz band, and its rules for Priority Access Licenses (PALs), as the Public Interest Spectrum Coalition describes in recent comments filed in response to the Spectrum Pipeline Act Public Notice.[117] Additionally, the Commission should expeditiously move to authorize point-to-multipoint (P2MP) fixed wireless services in the 3.7 GHz-4.2 GHz band to enable small and rural providers to bring high-speed broadband to unserved and underserved areas.[118] The Commission should also free up unlicensed spectrum in the 6

[116] Fourteenth Broadband Deployment Report Notice Of Inquiry, GN Docket No. 18-238 (Aug. 9, 2018), ¶ 26.
[117] Comments of New America's Open Technology Institute, the American Library Association, the Benton Foundation, Consumer Federation of America, Consumers Union, Institute for Local Self-Reliance, National Hispanic Media Coalition, Next Century Cities, Public Knowledge, Schools, Health, & Libraries Broadband Coalition, and X-Lab, GN Docket No. 17-258, GN Docket No. 15-319, GN Docket No. 17-183, GN Docket No. 14-177, (Sep. 11, 2018).
[118] *Id.*

GHz band to bring much-needed added capacity to Wi-Fi and other unlicensed technologies as reliance on them grows.[119]

X. Conclusion

It is clear from the Commission's own data that high-speed broadband is not being deployed to all Americans in a reasonable and timely fashion. The Commission should improve its data collection practices, increase its throughput benchmarks, and adjust how it defines adequate deployment and competition in the broadband market. Mobile broadband, meanwhile, is still not a viable substitute for fixed broadband, and the Commission should not consider mobile, nor mobile 5G networks, as viable substitutes. Finally, the Commission should implement spectrum-sharing frameworks and free up bands of unlicensed spectrum to help improve broadband access.

[119] *Id.*